

SEQUENCE LISTING

<110> Franco, Christopher Milton Mathew
Coombs, Justin Taylor

<120> A method and agents for improving plant productivity involving
endophytic actinomycetes and metabolites thereof

<130> 19460

<140> 10/563,637

<141> 2006-01-06

<160> 33

<170> PatentIn version 3.1

<210> 1

<211> 1158

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1155)

<223> "n" is unknown nucleotide

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cggccttngg gttgtaaacc tnttcagca gggacgaagt tgacgtgtac ctgtagaaga	420
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aattattggg cgtaaagagt ttgttaggtgg cttgttgcgt ttgccgtgaa agcccgtggc	540
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<210> 2
<211> 1437
<212> DNA
<213> actinomycete

<220>
<221> misc_feature
<222> (1)..(1437)
<223> "n" is unknown nucleotide

<400> 2 gctggcggcg tgcttaacac atgcaagtgc aacgatgaac cacttcggtg gggattagtg	60
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gggtctaat accggataac actnctgctc tcatggcag gggtaaaag ctccggcggt	180
gaaggatgag cccgcggcct atcagcttgt tggtgaggta atggctcacc aaggcgcacga	240
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<211> 317

<212> DNA

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<220>

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<222> (1)..(311)

<223> "n" is unknown nucleotide

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cgcccaataa ttccgganaa cgctcgcacc ctacntntt ccgcggctgc tggcncgtnt	240

ttagccgtg cttcttctgc aggtaccgtc actttcgctt ctcccgtct	naaaaaggtt	300
tacaacccta nggccgt		317
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<213> actinomycete		
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<221> misc_feature		
<222> (1)..(1043)		
<223> "n" is unknown nucleotide		
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gcaatcgtt tccggaatta ntggcgtaa agagntcgta ggcggcttat cacgtcggt		180
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tggcgaaggc ggatctctgg gccattactg acgctgagga gcgaaagcgt ggggagcga		360
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tgccccccctt gtggtcgggt tacaggtggt gcatggctgt cgtcagctcg tgtcgtgaga		660
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gggtgtatgg ggactcacag gagaacgccc gggtaactc ggaggaaggt ggggacgacg		780
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gctgcatac cgtgaggtgg agcgaatctc aaaaaagcct gtctcanttc ggattgggt		900
ctgnaantcg accccatgaa agtcggagtt gctaattatc ccagatcaac attgctggcg		960
gtgaatacgt tcccgcccccc ttggtaaaca ccgcccgtca angtnaagaa agtcggtaa		1020
cacccgaaan ccgggtggcc aanccct		1048

<210> 5
<211> 508
<212> DNA
<213> actinomycete

<220>
<221> misc_feature
<222> (1)..(472)
<223> "n" is unknown nucleotide

<400> 5
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cccgggcttt cacacccgac ntgacaagcc gcctacaaac tcttacgcc caataattcc 180
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ttctgcaggt accgtcactt tcgcttcttc cctgctgaaa aaggtttaca acccgaaggc 300
cgtcatccct cacgcggcgt cgctgcatca ggcttcgccc catttgcaa tattccccac 360
tgctgcctcc cntaggaatc tggccgtgt ctcaatccag tgtggccgtt cccctctcng 420
gccggctacc gtcntccctt ggtnaccatt anctcaccaa caactgatag gnccgcggct 480
catcttcacg cgggaacttt caaccacc 508

<210> 6
<211> 1420
<212> DNA
<213> actinomycete

<400> 6
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gtctaatacc ggatacgatt cggaggcat ctcctggtagtggaaagctc cggcggtgaa 180
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<210> 7

<211> 1239

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1217)

<223> "n" is unknown nucleotide

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ttgcacaang ggcgaaagcc tcatgcagng angccgcgtg agggaaagacg gcctttgggt	180
tgttaaacctn ttttagcagg gaagaagcga aagtgcacgt acctgcagaa gaagcgccgg	240

ctaantangt	gccagcagcc	gcggtaatan	gtagggcgca	agcgttgtcc	ggaattattg	300	
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gaatctcaaa	aagccggtct	cagttcgat	tgggggtctg	naactcgacc	ccatgaantc	1080	
ggagttgcta	ataatccaa	attcancatt	ggtgcggta	atactcccg	ggcctggta	1140	
acnaccgccc	gtcaactcac	gaaagtcggt	naaaccgaa	accgggtggc	caacccttg	1200	
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<210> 8

<211> 431

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(424)

<223> "n" is unknown nucleotide

<400> 8	ccgccttcgc	caccgggttt	cctcctgata	tctgcgcatt	tcaccgctac	accaggaatt	60
ccnatctccc	ctaccacact	ctagctagcc	cgtatcaa	at	gcaaacccgg	ggttaagccc	120
cgggcttca	catccnacgt	gacaagccgc	ctacaanctc	tttacgccc	ataattccgg		180
acaacgcttgc	cgcctacnt	attaccgcgg	ctgctggcac	ntat	tttagcc	ggcgcttctt	240

ctgcaggtac cgtcacttcc gctnctccc tgctgaaana ggtttacaac ccaaaggccn	300
tcatccctcn ccggcntcnt tgcntcngc ttncnccat tggtaannt tccccactgc	360
tncctccccct cggaatctgg gccgntgtct cattcccnnt ntggccggtc cccctcncag	420
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<210> 9

<211> 653

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(640)

<223> "n" is unknown nucleotide

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<210> 10

<211> 1444

<212> DNA

<213> actinomycete

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<210> 11

<211> 503

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(499)

<223> "n" is unknown nucleotide

<400> 11

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ctgcctcccg taggattctg ggccgtgtct cantcccant ntggccggtc ccctctcagg	420
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<210> 12

<211> 1173

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1144)

<223> "n" is unknown nucleotide

<400> 12

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ggataaacatt ttntcccgca tgggangggg ttgaaagntc cggcggtgaa ggatgagccc	180
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<210> 13

<211> 1404

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(493)

<223> "n" is unknown nucleotide

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tggcctacca aggcgacgac gggtagccgg cctgagaggg cgaccggcca cactgggant	240
gaganacggc ccagaatcct acgggaggca gcagtgggaa atattgcaca atgggcgaaa	300
gcctgatgca gcgacgcccgt gtgagggatg acggccttcg gttgtaaac ctttttcagc	360
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gccgcggtaa tangtagggc gcaagcgttg tccggaaatta ttgggcgtaa agagnttgc	480
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cgaaagcgtg	gggagcgaac	aggaattaga	taccctggta	gtccacgccc	taaacgttgg	720
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aagccggct	cagttcggat	tggggctgc	aactcgaccc	catgaagtcg	gagttctag	1260
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<210> 14
<211> 1411
<212> DNA
<213> actinomycete

<220>
<221> misc_feature
<222> (1)..(1411)
<223> "n" is unknown nucleotide

<400> 14	aacacatgca	agtcgaacga	tgaagccgct	tcgggtggtgg	attagtggcg	aacgggtgag	60
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	accggataac	actctgtccc	gcatgggacg	gggttgaag	ctccggcggt	gaaggatgag	180
	cccgccgcct	atcagcttgt	tggtgggtta	atggcctacc	aaggcgacga	cggtagccg	240
	gcctgagagg	gcgaccggcc	acactgggac	tgagacacgg	cccagactcc	tacgggaggc	300
	agcagtgggg	aatattgcac	aatgggcgaa	agcctgatgc	agcgacgccc	cgtgaggat	360

gacggcccttc gggttgtaaa cctctttag cagggaaagaa gcgaaagtga cggtacctgc 420
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gtccggatt attggggcgta aagagctcggt aggccggcttg tcacgtcgga tgtgaaagcc 540
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gaccccatga agtccgactt gctagtactc gcacgtcaac attgctgcgc tgaatacgtc 1320
cccggccctt gtacacaccg cccgtcacgt cacgaaagtc ggtaacacccc gaagccggtg 1380
gnccaacccc ttgtgggagg gagctgtcga a 1411

<210> 15

<211> 562

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(547)

<223> "n" is unknown nucleotide

<400> 15
ccgccttcgc caccgggttt cctcctgata tctgcgcatt tcaccgctac accaggaatt 60
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cgggccttca cacccnacnt nacaanccgc ctacaaactc tttacgcccc ataattccgg 180

acaacgcctt cgcctacttt attaccgcgg ctgctggcac ttatTTAGCC ggcgttctt 240
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tcatccctca cgcggcncg ctgcattcagg ctttcgccc ttgtcaata ttccccactg 360
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gccggctacc cgTCGTCNCC tnggtnaacc attanntcac caacaagctg ataggccgcg 480
ggctcatcct tcaccgcgg agctttAAC ccctgcccatt gaaaacagan gtnttatccg 540
gtattanaac ccgtttccag gg 562

<210> 16

<211> 1390

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1362)

<223> "n" is unknown nucleotide

<400> 16
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gacaaccgat ttgcattgtatc tggtggtgna aagtttttcg gcctgggatg tgcttcgcgg 180
cctatcagct tgggggtgag gtaatggctc acccaaggtc tcgacggtag ccggcctgag 240
agggtgaccg nccacactgg gactgagaca cggcccagac tcctacggga ggcagcagtg 300
gggaatattt gacaatgggc ggaagcctga tccagcaacg ccgcgtgagg gatgacggcc 360
ttcgggttgt aaacctcttt cagcacagac gaagcgcaag tgacggtatg tgcagaagaa 420
ggaccggcca actacgtgcc agcagccgcg gtaatacgtt gggtccgagc gttgtccgga 480
attattgggc gtaaaggcgt cgtagggcggt ctgtcgcgatc gggagtgaaa accaggtgct 540
taacacctgg cctgcttcg atacgggcag nctagaggtt cncaggggag aatggaaattc 600
ctgggtgtac ggtgaaatgc gcagatatac ggaggaaaca ccggtggcga agncggttct 660
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ggtagtccac accgtaaacg ttgggccta ggtgtgggac acattccacg tggccgtgc 780
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aatcccaaaa agccggtctc agttcggatt ggggtctgca actcgacccc atgaagtccg 1260
agtcgctagt aatcgcagat cagcaacgct gcggtaata cgttcccggg cttgtacac 1320
accgcccgtc acgtcacgaa agtccggcaac acccgaagcc antggcccaa ctcgtaaagag 1380
agggagctgt 1390

<210> 17

<211> 1411

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(638)

<223> "n" is unknown nucleotide

<400> 17
gtgcttaaca catgcaagtc gaacgatgaa gccgcttcgg tggtggatta gtggcgaacg 60
ggtagtaac acgtggccaa tctgcccttc actctggac aagccctgga aacggggct 120
aataccggat aacactctgt cccgcattggg acgggggttga aagctccggc ggtgaaggat 180
gagcccgccg cctatcagct tgggggtggg taatggccta ccaaggcgcac gacgggtac 240
cggcctgaga gggcgaccgg ccacactggg actgagacac ggcccagact cttacggag 300
gcagcagtgg ggaatattgc acaatggcg aaagcctgat gcagcgcacgc cgcgtgaggg 360
atgacggcct tcgggttta aaccttttc agcaggaaag aagcgaaagt gacggtaacct 420
gcagaagaag cgccggctaa ctacgtgcca gcagccgcgg taatacgtag ggcgcagcg 480
ttgtccggaa ttattggcg taaagagctc gttaggcggct tgtcacgtcg gatgtgaaag 540
cccgggctt aacccgggt ctgcattcga tacggctag ctagagtgtg gttagggaga 600
tcggaattcc tggtagcg gtgaaatgcg cagattnca ggaggaacac cggtggcgaa 660

ggcggatctc tggccattac tgacgcttag gagcgaaagc gtggggagcg aacaggatta	720
gataccctgg tagtccacgc cgtaaacgtt gggacttagg tgttggcgcac attccacgtc	780
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aacgcagaaga accttaccaa ggcttgacat ataccggaaa gcatcagaga tggtgcccc	960
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tgccgcgagg cggagcgaat ctcaaaaagc cggtctcagt tcggatttggg gtctgcaact	1260
cgaccccatg aagtcggagt tgctagtaat cgcagatcag cattgctgcg gtgaatacgt	1320
tcccgggcct tgtacacacc gccgtcacgt cacgaaagtc ggtaacaccc gaagccggtg	1380
gcccaaccgc cttgtggag ggaactttcc a	1411

<210> 18

<211> 1370

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1367)

<223> "n" is unknown nucleotide

<400> 18

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antntgtccc gcatgggacg gggtaaaag ctccggcggt gaaggatgag cccgcggcct	180
atnagcttgt tggtgggggtg atggcctacc aaggcgacga cggtagccg gcctgagagg	240
gcgaccggcc acactgggac tgagacacgg cccagactcc tacgggaggc agcagtgggg	300
aatattgcac aatgggcgaa agcctgatgc agcgacgccc cgtgagggat gacggccttc	360
gggttgtaaa ctttttcag cagggaaagaa gcaaaagtga cggtagctgc agaagaagcg	420
ccggctaaat angtgcgcagc agccgcggta atangtaggg cgcaagcgtt gtccggatt	480

attgggcgta aagagttgt aggccgcttg tcacgtngga tggaaagcc cggggcttaa	540
ccccgggtt gcattcgata cggctagct agagtgttgt agggagatc ggaattcctg	600
gtgttagcgtt gaaatgcgc aatatcagga ggaacaccgg tggcaaggc ggatctctgg	660
gccattactg acgntgagga gcgaaagcgt gggagcnaa cagnattaga taccctggta	720
gtccaagccg taaacgttgg gaactangtg ttggcgacat tccacgtcgt cnntccgca	780
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ttaccaaggt ttgccccata ccggaaagca tcagagatgg tgccccctt gtggcggtta	960
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cggcgccaa cccttggttnt gtgtngccag catgcccccc ggggtgatgg ggactcacag	1080
gagactgccc gggtaactc ggaggaaggt ggggacgacg tcaagtcatc atgccccctta	1140
tgtcttgggc tgcacacgtg ctacaatggc cggataatg agctgcgatg ccgcgaggcg	1200
gagcgaatct caaaaagccg gtntcagttc ggattgggtt ctgcaactcg accccatgaa	1260
gtcggagttt ctagtaatcg cagatcagca ttgctgcgtt gaatacgttc ccggcccttg	1320
tacacaccgc ccgtcacgtc acgaaagtgc gtaacacccg aagccgntgg	1370

<210> 19
<211> 1162
<212> DNA
<213> actinomycete

<220>
<221> misc_feature
<222> (1)..(1156)
<223> "n" is unknown nucleotide

<400> 19 gaacgatgaa gccgtttcggttgggattt gtggcgaacg gtgagtaaaa gtggcaattt	60
nccttcatt ttggacaagc cctggaaacg gtttaanac cgataacat tntgtccgc	120
atgggacggg gttgaaagnt cccggcggtt aaggatgagc ccggcgcnta tcagcttgg	180
ggtgtggtaa tggcctacca aggcacgac gggtagccgg cctgagaggg cgaccggcca	240
cactgggant gagacacggc ccagactcct acgggaggca gcagtgggaa atattgcaca	300
atgggcggaaa gcctgatgca ggcacgcccgc gtgagggatg acggccttgc ggttgtaaac	360

ctnttcagc	aggaaagaag	cgaagtgcac	ggtacctgca	gaagaagcgc	cggctaaata	420	
ngtgcagca	gccgcggtaa	tangtagggc	gcaagcggttgc	tccggatta	ttgggcgtaa	480	
agagcttgc	ggcggcttgt	cangtcggat	gtgaaagccc	ggggcttaac	cccgggttg	540	
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catggctgtc	gtcagctcg	gtcgtgagat	gttgggttan	gtcccgcaac	gagcgcnacc	1020	
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ggtccactcg	gaggaaggtg	gca	gacnacgt	canntcatca	tgccccctta	tgtcttgggn	1140
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<210> 20

<211> 1411

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1404)

<223> "n" is unknown nucleotide

<400> 20	gctggcggcg	tgcttaacac	atgcaagtgc	aacgatgaag	ccgcttcggt	ggtggattag	60	
	tggcgaacgg	gtgagtaaca	cgtggcaat	ctgccc	ttca	ctctggac	agccctggaa	120
	acggggtcta	ataccggata	acactctgtc	ccgcatgg	ga	cgggttgaa	agctccggcg	180
	gtgaaggatg	agcccgcggc	ctatcagctt	gttgg	gtgggg	taatggc	cta ccaaggcgac	240
	gacgggttagc	cggcctgaga	gggcgaccgg	ccacactgg	actgagacac	ggcccagact		300
	cctacgggag	gcagcagtgg	ggaatattgc	acaatggcgc	aaagcctgat	gcagcgacgc		360
	cgcgtgaggg	atgacggcct	tcgggttgta	aac	ctctt	tc	agcagggaa	420

gacggtacct gcagaagaag cgccggctaa ctacgtccca gcagccgcgg taatacgtag 480
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gatgtgaaag cccggggctt aaccgggt ctgcattcga tacgggctag ctagagtgtg 600
gtagggaga tcggaattcc tggtgttagcg gtgaaatgcg cagatatcag gaggaacacc 660
ggtggggaaag gcggatctct gggcattac tgacgctgag gagcgaaagc gtggggagcg 720
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anttcgacgc nacgcgaaga accttnccaa ggctgacata taccggaaag catcacagat 960
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tcggggtgat ggggactcac acgagactgt cnnggtcaac tcggaggaag gtggggacga 1140
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atgagnnnnnn atgcccgcgag gcggagcgaa tctcaaaaag ccggtctcag ttcggattgg 1260
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ctaagccggt gncccaaccc ctntggag g 1411

<210> 21
<211> 549
<212> DNA
<213> actinomycete

<220>
<221> misc_feature
<222> (1)..(431)
<223> "n" is unknown nucleotide

<400> 21
ccaganatcc gccttcgcca ccgggtttcc tcctgatatac tgcgcatttc accgctacac 60
caggaattcc gatctccctt accacactct agctagcccg tatcgaatgc agacccgggg 120
ttaagccccc ggctttcaca tccgacgtga caagccgcct acgagctctt tacgccaat 180
aattccggac aacgcttgcg ccctacgtat taccgcggct gctggcacgt agttagccgg 240
19

cgcttcttct gcaggtacgg tcactttcgc ttcttccctg ctgaaagagg tttacaaccc 300
gaaggncgtc atccctcacg cggcgtcgct gcatcaggct ttcgcccatt gtgcaatatt 360
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ccctctcagg ncggctaccc tcgtcgccctt ggtaggcatt accacaacaa gctgataaggc 480
gggggtcatac cttcaacgcc ggagcttcaa acccgtccat gcgggacaag tgtatccggt 540
attnaaaccc 549

<210> 22

<211> 672

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(643)

<223> "n" is unknown nucleotide

<400> 22
tcagtnatgg cccagaanga tccgncttcg ccaccggtgt tcctcctgat atctgcgcatt 60
ttcaccgcta caccaggaat tccgatctcc cctaccacac tctaacttagc ccgtatcgaa 120
tgcagacccg gggtaagcc ccgggcttcc acatccgacg tgacaagccg cctacgagct 180
cttnacgccc aataattccg gacaacgctt ggcgcctacg tattaccgcg gctgctggca 240
cgtagtttagc cggcgcttct tctgcaggta ccgtnacttt cgcttcttcc ctgctgaaag 300
aggttacaa cccgaaggcc gtcntccctc acgcggcgtc gctgcacatcag gctttcgccc 360
atngtgcant attccccact gntgnctccc gtangagtct gggccgtgtc tcagtcacag 420
tgtggccggc cgnccctctca ggccggctac cgtcgtcgcc ttggtaggnc attacccacc 480
aacaagctga tangtcgnng gctcatcctt caccgnccga gntttaaccc cgtncatgcg 540
ggacagagtg ttatccggta ttanaccgt atncagggtc tgtcccatag tgaagggnag 600
atngccacgt gttatcaccg ttcgnacta atnatcancg aancggcttc atcgttcgac 660
ttgcattgtgt ta 672

<210> 23

<211> 678

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(648)

<223> "n" is unknown nucleotide

<400> 23

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gcgcatttca	ccgctacacc	aggaattccg	atctccccta	ccacactcta	gctagccgt	120
atcgaatgca	gaccgggggt	taagccccgg	gctttcacat	ccgacgtgac	aagccgccta	180
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catgcgggac	agagtgttat	ccggtattaa	acccgttca	gggcttgtcc	canagtgaag	600
ggcagattgc	cacgtgttat	cancgttgc	ncactaatca	cancgaancg	ggttcatcgt	660
tcgacttgca	tgtgttaa					678

<210> 24

<211> 688

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(666)

<223> "n" is unknown nucleotide

<400> 24

ggcccgana	tccgncttcg	ccaccgggtgt	tcctcctgaa	tatctgcgca	tttcaccgct	60
				21		

acaccaggaa ttccgatctc ccctaccaca ctctaactag cccgtatcga atgcagaccc	120
ggggtaagc cccgggctt cacatccgac gtgacaagcc gcctacgagc tctttacgcc	180
caataattcc ggacaacgct tgcgcccctac gtattaccgc ggctgctggc acgtaattag	240
ccggcgcttc ttctgcaggt accgtcactt tcgcttcttc cctgctgaaa gaggttaca	300
acccgaaggc cgtcatccct cacgccccgt cgctgcatca ggcttcgccc catttgcaa	360
tattccccac tgctgnctcc cgtangagtc tgggcccgtgt ctcaagtccca gtgtggccgg	420
tcgnccctctc aggccggcta cggcgtcgc cttggtaggc cattacccca ccaacaagct	480
gatangccgn gggctcatcc ttcancgtcg gagctttcaa ncccgatccat gcgggacaga	540
gtgttatccg gtattanacc ccgtntcagg gcttgcctcan agtgaaggc agatngccac	600
gtgttatcac cgttcgccac taatnacanc gaaacggctt atcgtnccgac tgcatgttt	660
aacacncgca gcggtcgccc tgagccag	688

<210> 25

<211> 702

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(658)

<223> "n" is unknown nucleotide

<400> 25 ccctcagggt cagtaatggg cccagagatc cgccttcgcc accgggtttc ctcctgaata	60
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cgtatcaat gcagacccgg ggttaagccc cgggcttca catccgacgt gacaagccgc	180
ctacgagctc tttacgcccataattccgg acaacgcttgc cgcctacgt attaccgcgg	240
ctgctggcac gtagtttagcc ggcgttctt ctgcaggtagc cgtcaacttc gtttcttccc	300
tgctgaaaga gtttacaac ccgaaggccg tcatccctca cgcggcgctcg ctgcatcagg	360
ctttcgcccataatccgg ctgcctcccg taggagtctg ggccgtgtct	420
cagtcccagt gtggccggtc gccctctcag gccggctanc cgtcgcc 480 attanccan caacaagctg ataggncgac ggctcatnct tcaacgccc agctttcaan	540
cccgccatg cgggacagag tggtatncgg tattaaaccc gttcaggc ttgttccaga	600

gtgaaggca gattgccacg tgttatcaac cgttcggcac taatcacaac gaagcggnntt 660
atcggtcgac ttgcgttgtt taacaagccg ccagcggtcg tc 702

<210> 26

<211> 711

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(687)

<223> "n" is unknown nucleotide

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tcaccgctac accaggaatt ccgatctccc ctaccacact ctagctagcc cgtatcgaat 120
gcagacccgg ggttaagccc cgggcttca catccgacgt gacaagccgc ctacgagctc 180
tttacgccccataattccgg acaacgcttg cgcctacgt attaccgcgg ctgctggcac 240
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ggtttacaac ccgaaggccg tcatccctca cgcggcgtcg ctgcatcagg ctttcgcccc 360
ttgtgcaata ttccccactg ctgcctcccg taggagtctg ggccgtgtct cagtcccagt 420
gtggccggtc gccctctcag gccggctacc cgtcgtcgcc ttggtaggccc attacccac 480
caacaagctg ataggccgcg ggctcatcct tcaccgnccg agctttaacc ccgtcccatg 540
cgggacagag tgttatccgg tattagaacc cgtttccagg gcttgccttca gagtgaaggg 600
cagattgcca cgtgttactc anccggtcgn cactaatcan caacgaagcg gcttcatcgt 660
tcgacttgca tgtgttaagc acgcccncag cggtcgctcct gagccaggat c 711

<210> 27

<211> 522

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(465)

<223> "n" is unknown nucleotide

<400> 27

tcagtatcng cccagagatc cgccctcgcc accggtgttt cctcctgata tctgcgcatt 60
tcaccgctac accaggaatt ccgatctccc ctaccgaact ctagcctgcc cgtatcgact 120
gcagagccgg ggttaagccc cgggcttca caaccgacgt gacaagccgc ctacgagctc 180
tttacgcccc ataattccgg acaacgcttg cgcctacgt attaccgcgg ctgctggcac 240
gtagttagcc ggcgcttctt ctgcaggtac cgtcacttc gcttcttccc tgctgaaaga 300
ggtttacaaa ccgaaggccg tcatccctca cgcggcgtcg ctgcatcagg ctttcgcccc 360
tttgcaata ttccccactg gtgnctcccg tangagtctg gggcgtgtct cantccagtg 420
tgggcggtcg cctctcaggg cggctaccgt cgtcgcttgg tgagnacta ctcacaacaa 480
qctqataqqc qcqqqctcat ctqqaacqqc qqaqctttac ac 522

<210> 28

<211> 670

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(638)

<223> "n" is unknown nucleotide

<400> 28

tcgtaatgg cccaganatc cgnctcgcc accggtgttc ctccgtatctgcgcattt 60
caccgctaca ccaggaattc cgatctcccc taccacactc taactagccc gtatcgaatg 120
cagacccggg gttaaagcccc gggcttcac atccgacgtg acaagccgcc tacgagctct 180
ttacgccccaa taattccgga caacgcttgc gccctacgta ttaccgcggc tgctggcacg 240
tagttagccg gcgccttcttc tgcaggtaacc gtcactttcg cttcttccct gctgaaagag 300
gtttacaacc cgaaggccgt catccctcac gcggcgtcgc tgcatcaggc tttcgcccat 360
tgtgcaatat tccccactgc tgcctccgt angagtctgg gccgtgtctc agtcccagtg 420
tggccgggtcg ccctctcagg ccggctaccg tcgtcgccctt ggtaggccat tacccaccaa 480

caagctgata	ngncgngggc	tcatcccca	ccgnccggagc	tttcaanccc	gtccccatgcg	540
ggacagagt	ttatccggta	ttaaaccgt	ntccagggt	tgtccatagt	gaagggcaga	600
ttgccaagt	ttatcancg	ttcgncacta	atcatcancg	aagcggcttc	atcgttcgac	660
tgcatgttt						670

<210> 29

<211> 676

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(666)

<223> "n" is unknown nucleotide

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	tgcgcatttc	accgctacac	caggaattcc	gatctccct	accacactct	anctagcccg	120
	tatcgaatgc	agacccgggg	ttaagccccg	ggctttcaca	tccgangtga	caagccgcct	180
	acgagcttt	tacgccccaaat	aattccggac	aangcttgcg	ccctacgtat	taccgcggnt	240
	gctggcacgt	agtttagccgg	cgcttcttct	gcaggtaccg	tcactttcgc	ttcttcctg	300
	ctgaaagagg	tttacaaccc	gaaggccgtc	atccctcacn	cggcgtcgct	gcatcaggct	360
	ttcgcccatt	gtgcaatatt	ccccactgct	gcctcccgta	ggagtctggg	ccgtgtctca	420
	atcccantgt	ggccggtcgc	cctctcangc	cggctaccgt	cgtcgcttgg	taggccatta	480
	ccccaccaac	aagctggata	ggncgggggc	tcattctca	ccgcccggaaag	ctttaanccc	540
	gtccatgcgg	gananagtgn	atccngtat	taaaccnngt	ttcagggctt	gtccanagtg	600
	aaggngatt	gcccnaagtgt	ttatcncccg	ttcgccanta	atcnacaacg	aaagcggntt	660
	cntcgnttcg	acttgc					676

<210> 30

<211> 626

<212> DNA

<213> actinomycete

<220>
<221> misc_feature
<222> (1)..(618)
<223> "n" is unknown nucleotide

<400> 30
taatggccca gaanatccgc cttgccacc ggtgttcctc ctgaatatct gcgcattca 60
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gaccggggta taagccccgg gcttcacat ccgacgtgac aagccgccta cgagctttt 180
acgccaata attccggaca acgcttgcgc cctacgtatt accgcggctg ctggcacgta 240
gttagccggc gcttcttctg caggtaccgt cacttcgct tctccctgc tgaaagaggt 300
ttacaacccg aaggccgtca tccctcacgc ggcgtcgctg catcaggctt tcgcccattg 360
tgcaatattc cccactgctg cctcccgtag gagtctggc cgtgtctcag tcccagtgtg 420
gcggtcgccc tctcaggccg gntanccgtc gtcgccttgg tangccatta ncccaccaac 480
aagctgatan gccgnnnnct catccttcan cgccggagct tttaaccccg tcccatgcgg 540
gacagagtgt tatccggat tagatccgt ntccagggt tgtnatagtg gaagggcana 600
ttgccacgtg ttactcancc gttcgc 626

<210> 31
<211> 20
<212> DNA
<213> primer

<400> 31
agagtttgat cmtggctcag 20

<210> 32
<211> 21
<212> DNA
<213> primer

<400> 32
ctgttgctc cccacgcttt c 21

<210> 33

<211> 22

<212> DNA

<213> primer

<400> 33

tacggytacc ttgttacgac tt

22